



## OS33B-1783 - The Response of Algae and Herbivores to *Acropora Cervicornis* Coral Decline: A Case Study in Coral Gardens, Belize



Wednesday, 11 December 2019



13:40 - 18:00



Moscone South - Poster Hall

### Abstract

*Acropora cervicornis*, an endangered coral, provides habitat and a complex structural framework for reef ecosystems. Coral Gardens, Ambergris Caye, Belize is one of the largest areas of extant *A. cervicornis* in the Caribbean. This reef provides a rare opportunity to study changing ecosystem dynamics of a living *A. cervicornis* reef with declining coral cover, but intact skeletal framework. Many studies have shown that as corals decline, reefs commonly transition from coral to algal dominated. We examined the relationship between algae, algae consumers, and other coral species on the reef with declining *A. cervicornis* cover from 2014 to 2019. Urchins (*Echinometra viridis*) are herbivorous grazers that consume algae from the reef framework. Damselfish (*Stegastes adustus*, *Stegastes planifrons*, and *Microspathodon chrysurus*) are farmerfish that cultivate algae by either using "chimneys" they create by biting coral tissue or grazing algal lawns on dead coral. Live coral cover was quantified from analysis of 141 m<sup>2</sup> quadrat photos. Urchin and damselfish abundance was measured within m<sup>2</sup> quadrats across five established transects (15 to 38 meters in length). Coral species, non-living coral framework, sediment, and algae presence were documented every 0.5 m along each transect using a point count method. Between 2014 and 2019, there was a 10.6% increase in non-living framework and a 5.8% increase in algae. Surprisingly, the increase in algae was less than the increase in non-living coral framework; perhaps a result of the increase in urchin population from 17.4 per m<sup>2</sup> in 2014 to 21.4 per m<sup>2</sup> in 2019 across all five transects. Our data showed a 2-29% decrease in live coral cover across the 5 individual transects between 2014 and 2019 using photo analysis. Other corals exhibited a response to the declining *A. cervicornis*, particularly by *Agaricia agaricites* which increased 6.3% in the five-year study period. Between 2014 and 2019, damselfish increased by 15% on average (from 2.0 to 2.3 per m<sup>2</sup>) on all five transects, suggesting damselfish may have a minor impact on algal growth at Coral Gardens. Our data emphasize the importance of herbivores on this reef and the complex interactions between algae, coral, and herbivores in an era of coral decline.

### Authors

**Catherine Rachael Caterham**

Franklin and Marshall College

**Nick (nick) An**

Oxford College of Emory University

**Sydney Walters**

Colgate University

**Arthur Mabaka**

Washington and Lee University

**Ginny Johnson**

Washington and Lee University

**Karl R Wirth**

Macalester College

**Lisa Greer**

Washington and Lee University